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PATENT

SUBSTITUTE SPECIFICATION

Optical Reader Device Reading Bar Code Symbols

Cross References to Related Applications

[0001] This application is a divisional of U. S. Patent Application No. 09/385,597 filed on August 30, 1999, which is a continuation-in-part of U. S. Patent Application No. 08/839,020 filed April 23, 1997, which issued as U. S. Patent No. 5,965,863 on October 12, 1999, which is a continuation-in-part of U. S. Patent Application No. 08/697,913 filed on September 3, 1996, which issued as U. S. Patent No. 5,900,613 on May 4, 1999, which is a continuation-in-part of U. S. Patent Application No. 08/516,185 filed August 18, 1995, which is now abandoned, which is a continuation-in-part of U. S. Patent Application No. 08/205,539 filed on March 4, 1994, which issued as U. S. Patent No. 5,463,214, the aforementioned 08/697,913 filed September 3, 1996 also being a continuation-in-part of U. S. Patent Application No. 08/504,643 filed July 20, 1995, which issued as U. S. Patent No. 5,773,806 on June 30, 1998. The priorities of all of the above applications are claimed, and the disclosure of each of the above applications is incorporated herein by reference in its entirety.

Background Of The Invention

[0002] The present invention relates to optical reading devices, and is directed more particularly to an optical reading device that can read bar code symbols.

Description Of The Prior Art

[0003] One-dimensional optical bar code readers are well known in the art. Examples of such readers include readers of the SCANTEAM® 3000 Series manufactured by Welch Allyn, Inc. Such readers include processing circuits that are able to read one-dimensional (1D) linear bar code symbologies, such as the UPC/EAN code, Code 39, etc., that are widely used in supermarkets. Such 1D linear symbologies are characterized by data that is encoded along a single axis, in the widths of bars and spaces, so that such symbols can be read from a single scan along that axis, provided that the symbol is imaged with a sufficiently high resolution along that axis.

[0004] In order to allow the encoding of larger amounts of data in a single bar code symbol, a number of 1D stacked bar code symbologies have been developed, including Code 49, as described in U.S. Patent No. 4,794,239 (Allais), and PDF417, as described in U.S. Patent No. 5,340,786 (Pavlidis, et al). Stacked symbols partition the encoded data into multiple rows, each including a respective 1D bar code pattern, all or most all of which must be scanned and decoded, then linked together to form a complete message. Scanning still requires relatively high resolution in one dimension only, but multiple linear scans are needed to read the whole symbol.

[0005] A third class of bar code symbologies, known as two-dimensional (2D) matrix symbologies, have been developed which offer orientation-free scanning and greater data densities and capacities than their

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